Ordering number:EN2836

NPN Triple Diffused Planar Silicon Transistor

2SC3991

500V/50A Switching Regulator Applications

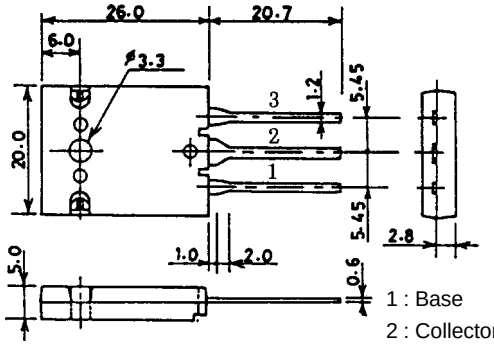
Features

- High breakdown voltage, high reliability.
- Fast switching speed (t_f=0.1μs typ).
- Wide ASO.
- Adoption of MBIT process.

Package Dimensions

unit:mm

2048B



1 : Base
2 : Collector
3 : Emitter
SANYO : TO-3PBL

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		800	V
Collector-to-Emitter Voltage	V_{CEO}		500	V
Emitter-to-Base Voltage	V_{EBO}		7	V
Collector Current	I_C		50	A
Collector Current (Pulse)	I_{CP}	PW≤300μs, duty cycle≤10%	70	A
Base Current	I_B		14	A
Collector Dissipation	P_C		3.5	W
		Tc=25˚C	300	W
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$*	V_{CE}=5V, I_C=4.8A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=24A	8			
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=4.8A		18		MHz
Output Capacitance	C_{ob}	V_{CB}=10V, f=1MHz		560		pF

* : The $h_{FE}1$ of the 2SC3991 is classified as follows. When specifying the $h_{FE}1$ rank, specify two ranks or more in principle.

15	L	30	20	M	40	30	N	50

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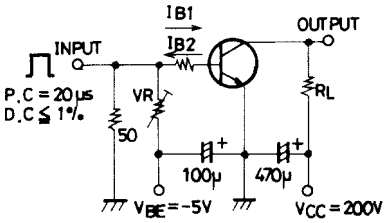
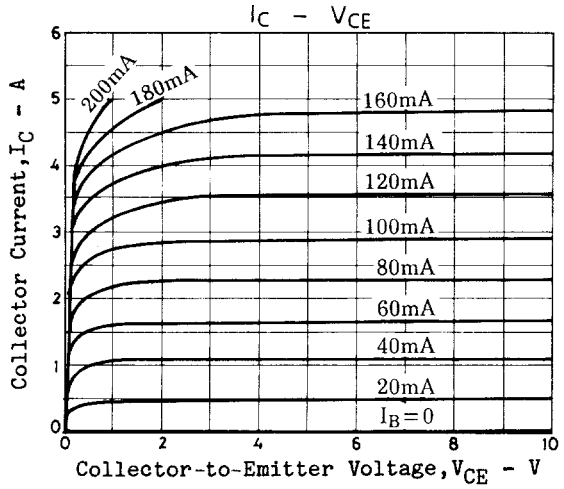
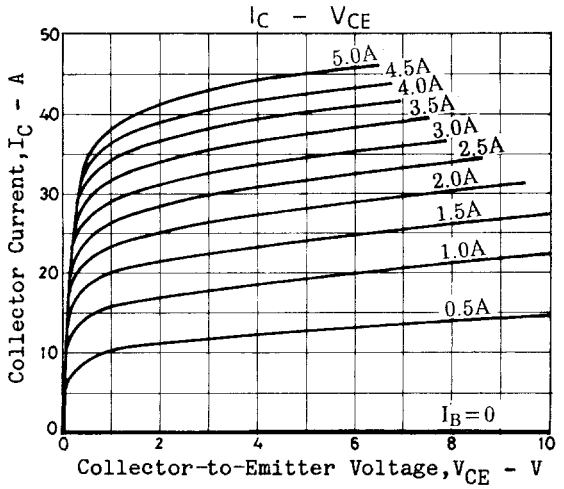
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=24A, I_B=4.8A			1.0	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=24A, I_B=4.8A			1.5	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=1mA, I_E=0	800			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=10mA, R_{BE}=∞	500			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=1mA, I_C=0	7			V
Collector-to-Emitter Sustain Voltage	$V_{CEX(sus)}$	I_C=15A, I_{B1}=–I_{B2}=–2A, L=100μH, clamped	500			V
Turn-ON Time	t_{on}	V_{CC}=200V, 5I_{B1}=–2.5I_{B2}=I_C=26A, R_L=7.7Ω			0.5	μs
Storage Time	t_{stg}	V_{CC}=200V, 5I_{B1}=–2.5I_{B2}=I_C=26A, R_L=7.7Ω			3.0	μs
Fall Time	t_f	V_{CC}=200V, 5I_{B1}=–2.5I_{B2}=I_C=26A, R_L=7.7Ω			0.3	μs

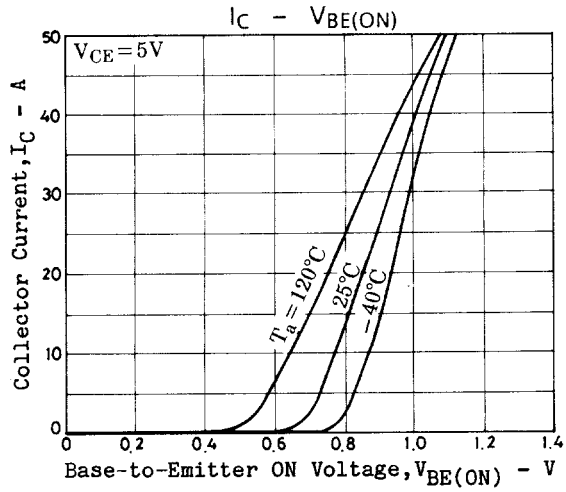
Switching Time Test Circuit

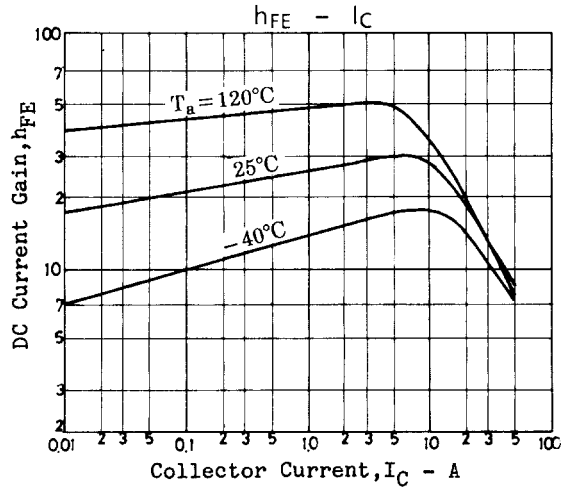


Unit (resistance : Ω, capacitance : F)

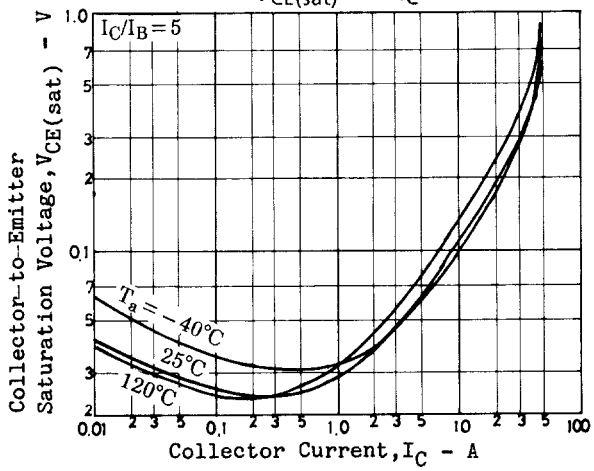




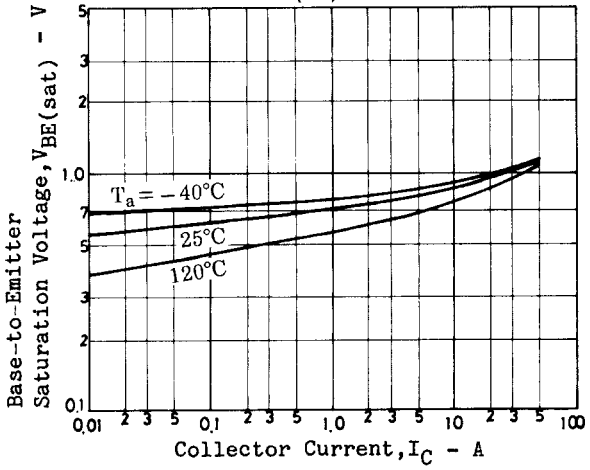




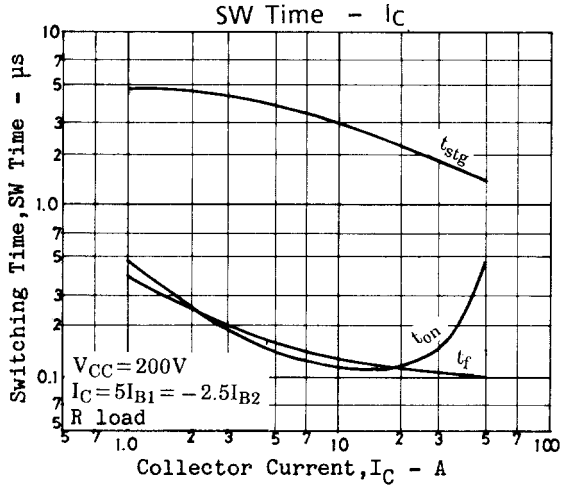
$V_{CE(sat)}$ – I_C



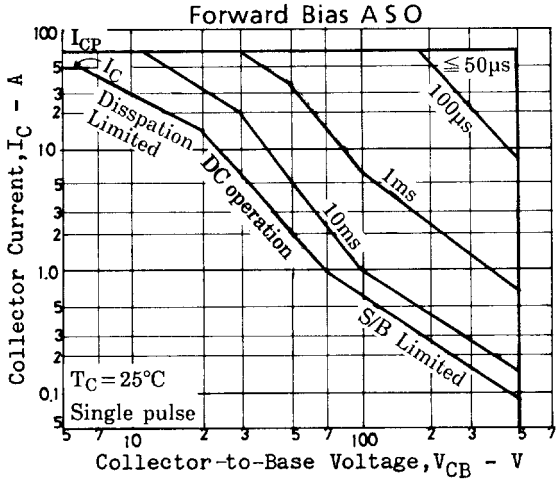
$V_{BE(sat)}$ – I_C



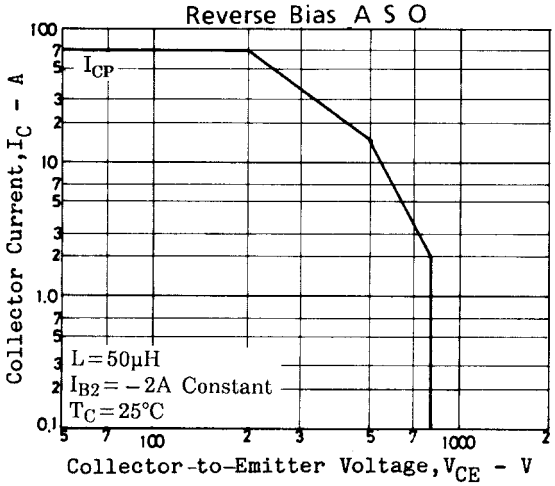
SW Time – I_C



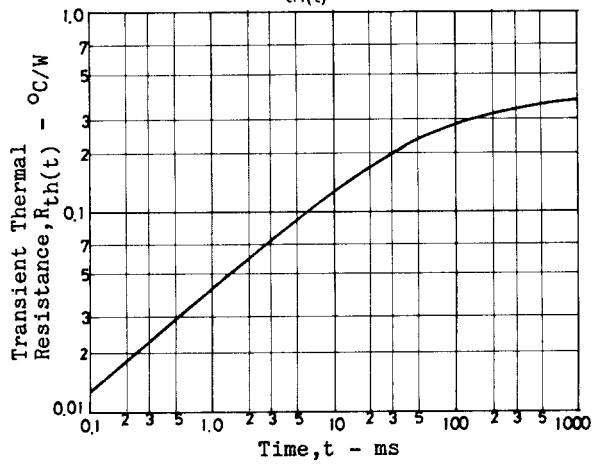
Forward Bias A S O



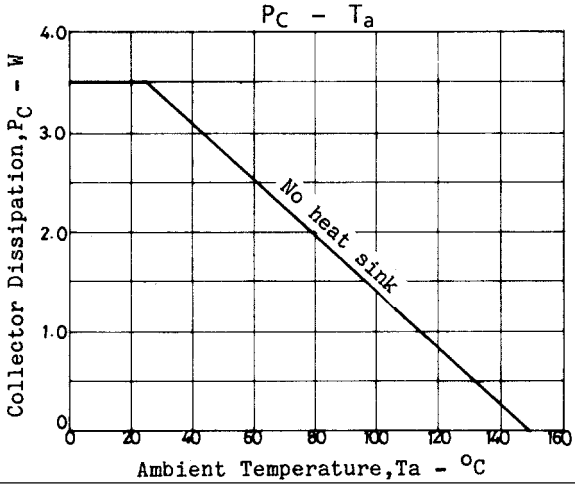
Reverse Bias A S O



$R_{th(t)}$ – t



P_C – T_a



P_C – Tc